CA-IR-21

Ref: Exhibit 402.

Please identify the names and locations of the 46 kV substations that are pertinent to the study area in the instant docket. Please provide the conductor size, normal and emergency ratings (in Amps) of 46 kV lines fed from Pukele, Koolau, Archer, School, Kewalo and Kamoku substations.

HECO Response:

Please refer to page 4 of the response to this IR for the names and locations of the 46kV substations pertinent to the study area in this docket. The following lists identifies the transmission substations where the power is transformed or "stepped down" from a voltage of 138kV to 46kV. Under each transmission substation is a list of the 46kV substations which the transmission substations feed. Each transmission substation also feeds some 46kV load. For instance a 46/12kV transformer is located at the Pukele Substation and is connected to 12kV circuits originating from the Pukele Substation.

Archer Substation	**Honolulu Substation**	**Iwilei Substation**
Kewalo	Kakaako	Fort Shafter
Makaloa		Kapalama
McCully		Keehi
Piikoi		Mapunapuna
		Sand Island
		Waiakamilo

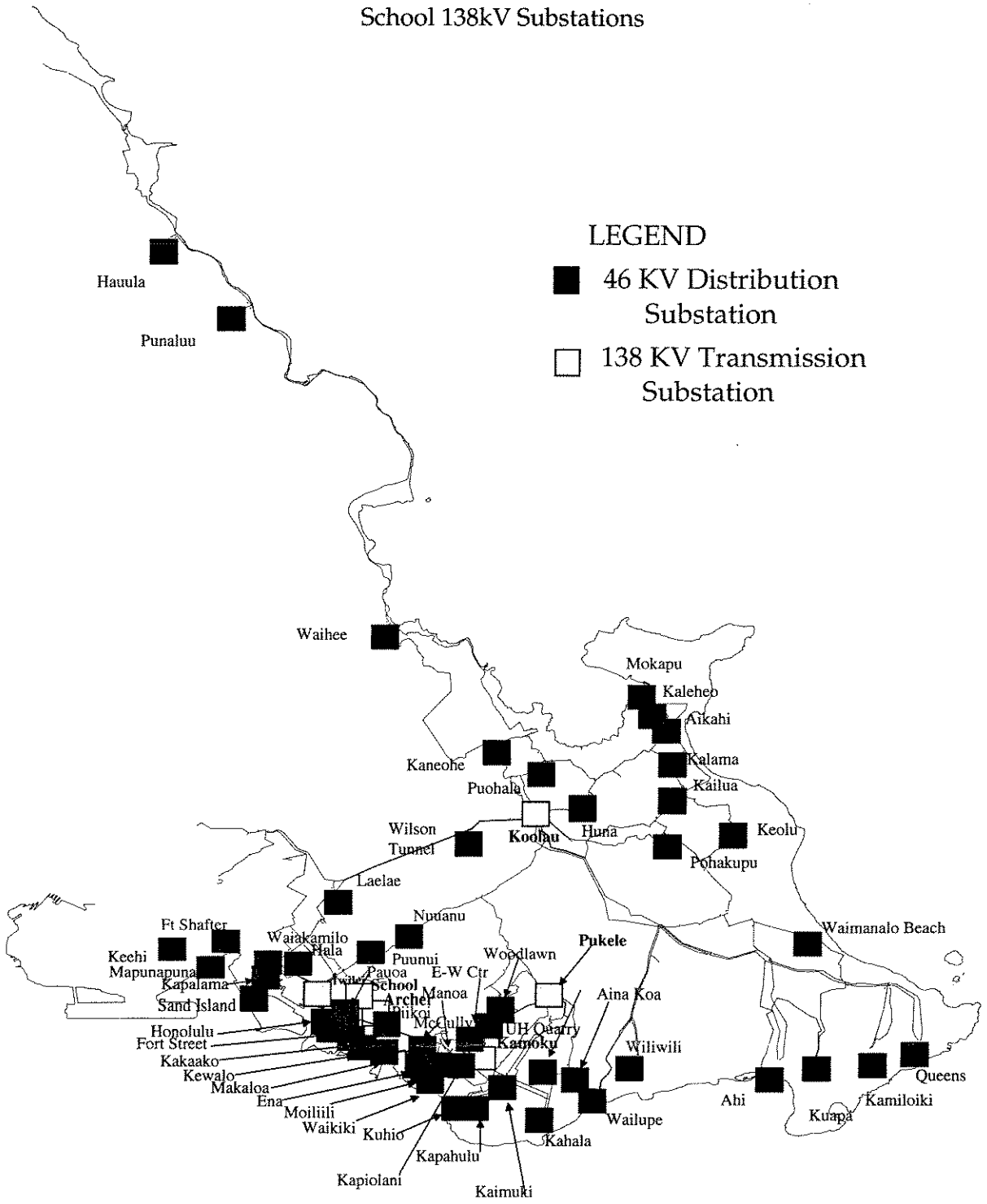
Koolau Substation	Pukele Substation	School Street Substation
Ahi	Aina Koa	Fort Street
Aikahi	East West Center	Hala
Aina Koa	Ena	Nuuanu
H-3 Haiku Tunnel	Kahala	Pauoa
Hauula	Kaimuki	Puunui
Huna	Kapahulu	
Kaheohe	Kapiolani	
Kailua	Kuhio	
Kalaheo	Manoa	
Kalama	McCully	
Kamiloiki	Moiliili	
Keolu	UH Quarry	
Kuapa	Waialae	
Laelae	Waikiki	
Mokapu	Woodlawn	
Nuuanu		
Pohakupu		
Punaluu		
Puohala		
Queens		
Waihee		
Wailupe		
Waimanalo Beach		
WiliWili		
Wilson Tunnel		

Conductor sizes, normal ratings and emergency ratings are provided in the table on page 5 of this IR response. (The information requested is confidential because of concerns regarding the security of the transmission grid. This information will be provided to the Commission and the Division of Consumer Advocacy under an appropriate protective order.) Please note that most 46kV circuits do not use the same conductor along the entire 46kV circuit. Typically, the cables originating from the transmission substation will have the largest cable, in order to provide enough sub-transmission capacity to export the total power being demanded from the various 46kV substations each 46kV circuit feeds. Other areas near the end or in the middle of the

circuit will require less sub-transmission capacity because power at each 46kV substation along the circuit will be subtracted from the total amount of power being demanded at the origin or the circuit. Table 4 provides the conductor sizes and normal and emergency ratings for the conductors at the origin of the circuit (at the transmission substation feeding the circuit). An example of how the conductor sizes can vary on a circuit is also provided for the Archer 41 and Koolau-Kahuku 46kV circuit.

46KV Sub-Transmission System

Distribution Substations fed from the Archer Iwilei, Kamoku, Kewalo, Koolau, Pukele and School 138kV Substations



This page intentionally left blank